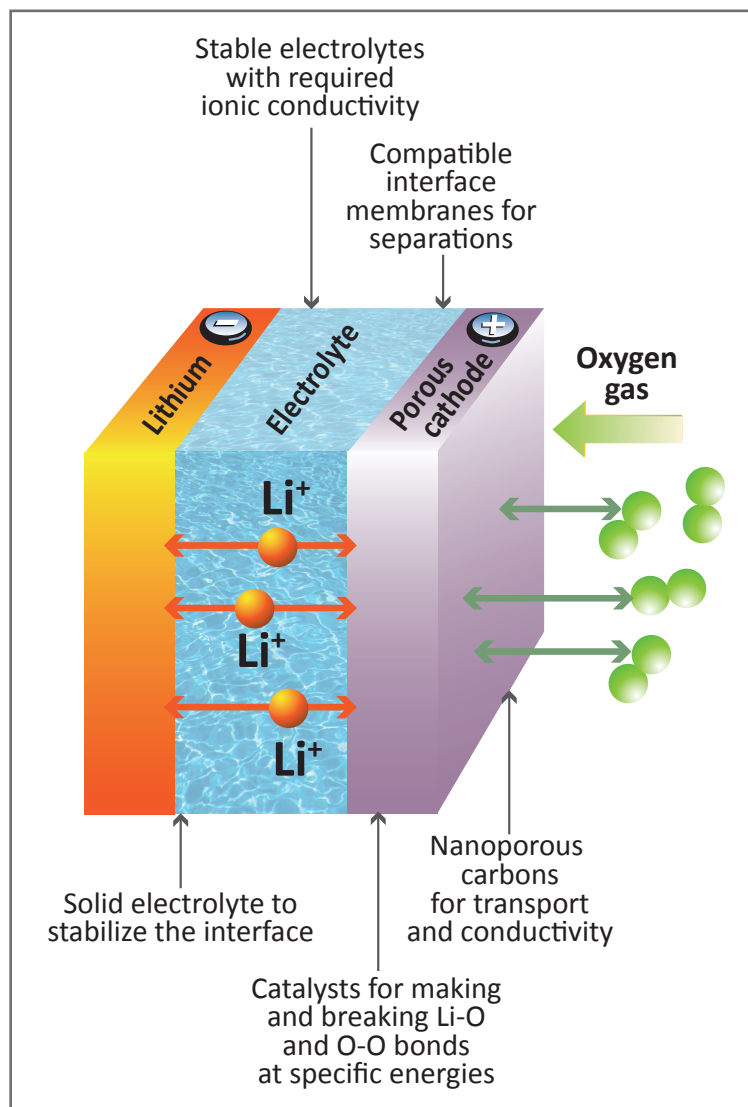
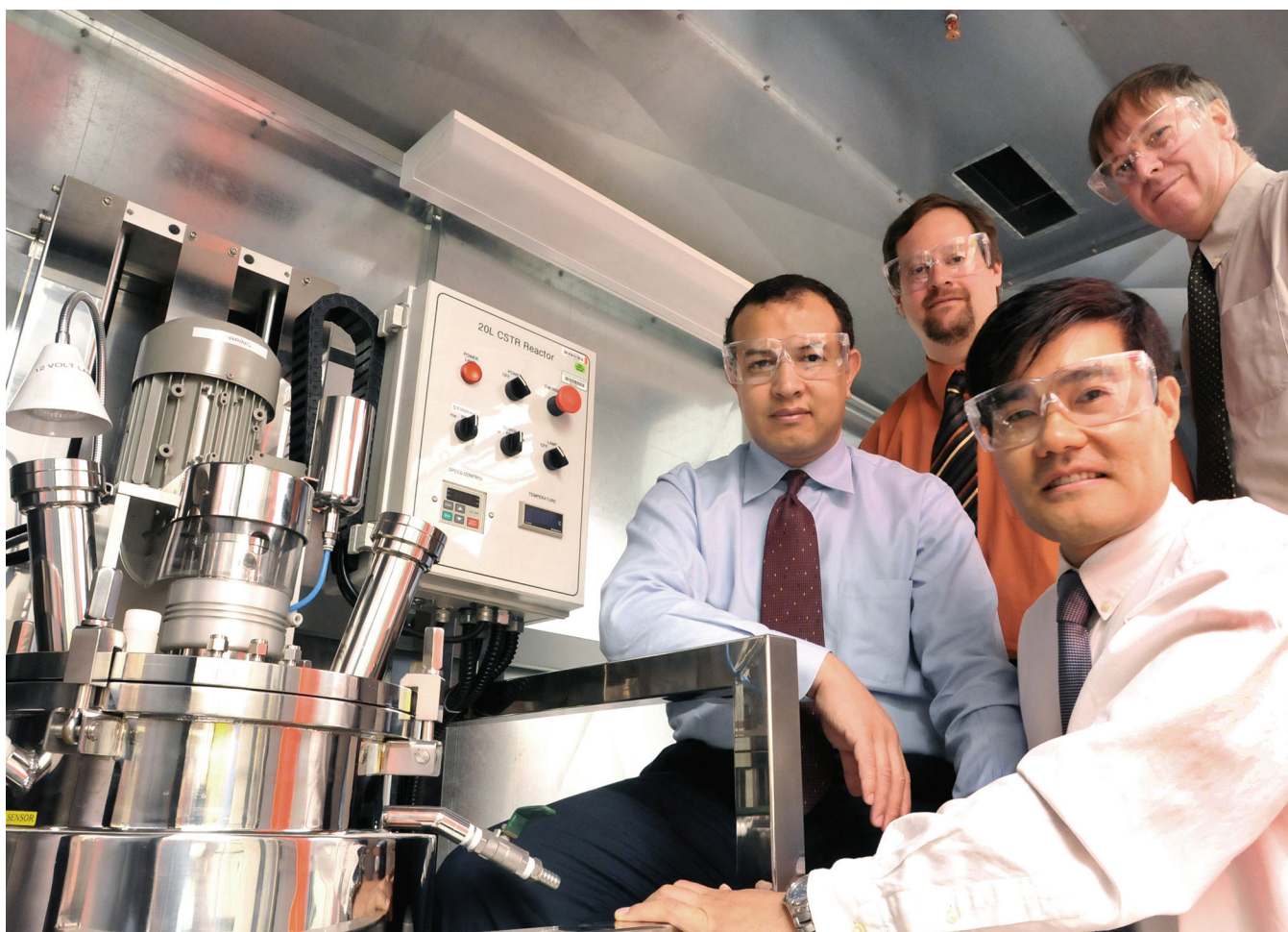


# Lithium-Air Battery Facts

- ▶ Lithium-ion (Li-ion) batteries will be a bridge technology to Lithium-air (Li-air) batteries for electric vehicle applications, assuming technological hurdles are overcome.
- ▶ Li-air batteries use a catalytic air cathode that supplies oxygen, an electrolyte and a lithium anode.
- ▶ Li-air batteries will have a capacity for energy storage that is five to 10 times greater than that of Li-ion batteries.
- ▶ Development of a viable Li-air battery will require a technology breakthrough. However, as with Li-ion batteries, it will take one to two decades before the technology could be commercially adopted.
- ▶ Li-air batteries have both scientific and engineering challenges.
  - Science: The challenge is materials development, including creation of an advanced catalyst, a highly stable electrolyte, and efficient stabilization of the lithium anode metal.
  - Engineering: The challenge includes the development of high-porosity gas diffusion electrodes, ways of depositing the catalyst onto the cathode and developing a membrane to prevent oxygen crossover to the lithium anode.



*Li-air batteries hold the promise of increasing the energy density of Li-ion batteries by as much as five to 10 times. But that potential will not be realized until critical scientific challenges have been addressed.*



*Argonne's staff of world-class interdisciplinary researchers has developed a broad and deep understanding of the scientific challenges involved in the development of advanced batteries. These researchers will continue to build on this knowledge so they can leap the high hurdles required for the development of commercially-viable Li-air batteries.*

- ▶ Argonne is ideally suited to lead Li-air research and development (R&D) because it has:
  - A broad and deep range of experience in the development of Li-ion batteries;
  - An expert staff of scientists and engineers that have led the development of new materials for advanced batteries, including Li-ion batteries and development of a catalyst for fuel cells;
  - Business development professionals that have helped forge relationships with industry partners to adopt the technology for commercial applications;
  - An interdisciplinary Li-air R&D program to examine all the challenges associated with developing safe, high-energy and long-life batteries; and
  - Access to research tools – such as the Advanced Photon Source, the Center for Nanoscale Materials and one of the world's fastest supercomputers – to accelerate R&D.